Trend Study 22-11-03

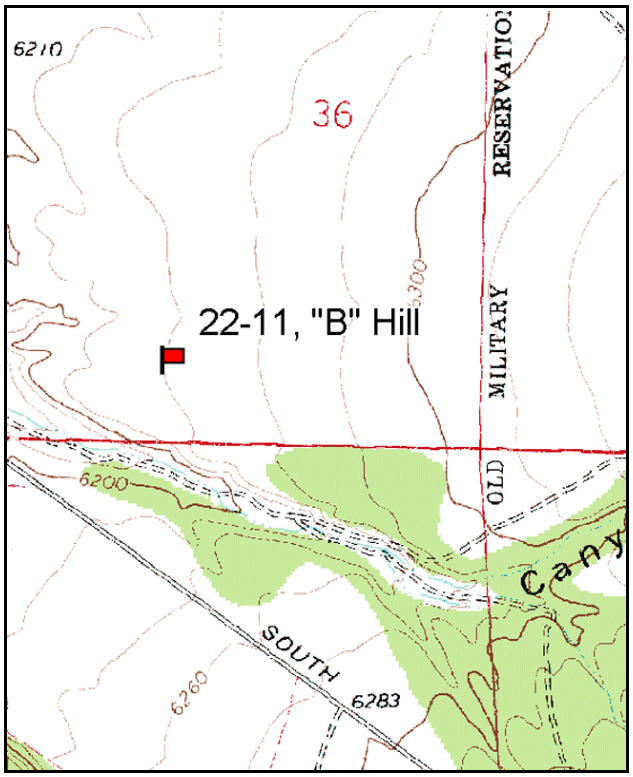
Study site name: 'B' Hill . Vegetation type: Big Sagebrush-Grass .

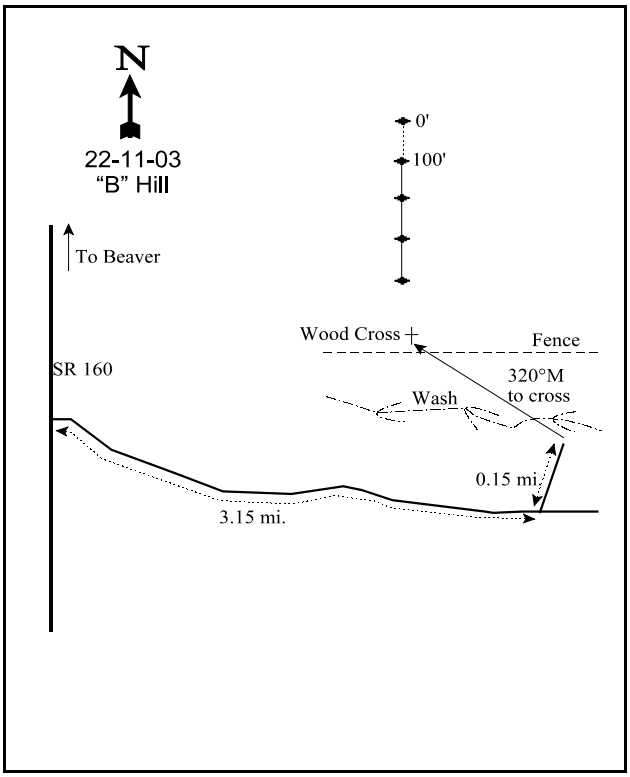
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Starting from Beaver High School on Main Street, go south 1.6 miles. On the east side of the road there is a rock monument commemorating the "Lee's Ranch Indian Raid". Turn east at the monument onto South Creek Road. Go 3.15 miles up South Creek Road staying on the main road. Turn left and go down to the bottom of the wash where it meets another road. From this intersection, walk up the hill to the north at 320 degrees magnetic to the wooden cross braces. From the left wood post, go 100 feet at 15 degrees magnetic to the 400-foot stake. The study is marked by 2 ½ foot rebar that are 100 feet apart. The 0-foot baseline stake is marked by a short rebar tagged #7059.





Map Name: Kane Canyon

Township 29S , Range 7W , Section 36

Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4233071 N, 360209 E

DISCUSSION

'B' Hill - Trend Study No. 22-11

This study is located on a section of DWR land which is part of the critical and limited deer winter range south of Beaver and east of I-15. Historically, deer concentrate here in the South Creek area during the winter with the accompanying problems of spring crop depredation and overuse on the range. The range type is sagebrush-grass. A pinyon-juniper eradication project and aerial seeding was done in 1959. Some locations were harrowed and drilled. The wash just to the south of the study area contains an open stand of Utah juniper and provides the only cover near the flat. The site is nearly level with only a slight slope to the west and an elevation of 6,200 feet. The DWR "B" Hill pellet group transect, which samples a slightly higher elevation area near the study site, averaged 53 deer days use/acre (131 ddu/ha) from 1980-1985 (Jense et al. 1985), and 55 deer days use/acre (136 ddu/ha) from 1986-1990 (Jense et al. 1991). The pellet transect was not read in 1992. From 1993-1997, deer use averaged 17 days use/acre (42 ddu/ha) (Evans et al. 1997). A pellet group transect read on the trend study site estimated 5 deer days use/acre and 13 cow days use/acre (12 ddu/ha and 32 cdu/ha) in 1998, and 14 deer and 4 cow days use/acre (35 ddu/ha and 9 cdu/ha) in 2003.

Due to the levelness of the terrain, runoff and the hazard of erosion is low. Soils were given a stable rating from an erosion condition class assessment completed in 2003. The soil surface and profile are very rocky and there are current signs of pedestalling around some of the plants. Soil analysis indicates a sandy clay loam texture with a neutral pH (7.1). Average effective rooting depth was estimated at just over 13 inches. Average soil temperature was estimated at 39.6°F at 14 inches in depth in 1998. Soil temperature averaged nearly 68°F in 2003 indicating a much drier soil profile due to drought conditions. Phosphorous levels in the soil profile measured only 4.6 ppm and may be limiting to vegetative development as 10 ppm is considered minimal for normal plant growth. There appears to be a hardpan about one foot below the surface. Bare ground has been quite high in all years and was estimated at 27% in 2003. Vegetation and litter cover are only fair on this site.

Wyoming big sagebrush is the key browse species on the site, although the population density is moderately low. Sagebrush density was estimated at 1,200 plants/acre in 1998 and 1,040 in 2003. The percentage of plants in poor vigor increased from 0% in 1985 and 1991 to 13% in 1998 and 15% in 2003. The growth form of Wyoming big sagebrush is somewhat stunted as evidenced by an average height of less than two feet. The decadence rate was fairly low in 1991 and 1998 at just over 20%, but increased to 40% in 2003. No decadent plants were sampled during the initial reading in 1985. The proportion of young plants in the population was high enough from 1985-1998 to replace the decadent, dying individuals. In 2003, recruitment by young plants declined to 4%, resulting in there being fewer young than the number of plants classified as decadent and dying. This may result in a slight decline in sagebrush numbers by the next reading. Utilization of big sagebrush was moderate in 1985 and 1991. In 1998 and 2003, the number of plants displaying heavy and moderate use increased. Annual sagebrush leader growth averaged 1.3 inches when the transect was read in June of 2003. There are a few Nevada ephedra and bitterbrush scattered around the site as well.

The most common grasses are crested wheatgrass and Russian wildrye. Crested wheatgrass has maintained a stable nested frequency value over all readings. While Russian wildrye declined between 1991 and 1998, but increased significantly between 1998 and 2003. Western wheatgrass, intermediate wheatgrass, and Indian ricegrass are also important species present on the site, but these occur in low densities. Sum of nested frequency for all perennial grasses remained stable between 1998 and 2003, although the value is lower in these years compared to the 1985 and 1991 surveys. Forbs are sparse and add very little in terms of forage production and ground cover on this site. Scarlet globemallow and heath aster had fair abundance in 1991, but both species have steadily declined since.

1985 APPARENT TREND ASSESSMENT

Soils appear stable due mostly to the relatively level terrain. The vegetative condition has the potential to improve if livestock grazing is eliminated for a few years. Increased enforcement of regulations and fence repairs should help curtail the trespass problems. There is a lack of diversity in the vegetative community, but competition with seeded species should keep annuals and other invaders from increasing. A rest from livestock grazing would allow the sagebrush and various grasses present to regain vigor, reproduce, and build up litter.

1991 TREND ASSESSMENT

The soil trend for the site is down even with the increase in basal vegetative cover. Litter cover has decreased to 20% and percent bare ground has doubled to 40%. There is only one key browse species present, Wyoming big sagebrush, which has demonstrated declining numbers, including fewer young, and increased decadence. Trend for browse is slightly down. The trend for both grasses and forbs is slightly up with increased nested frequency values.

TREND ASSESSMENT
soil - down (1)
browse - slightly down (2)
herbaceous understory - slightly up (4)

1998 TREND ASSESSMENT

The soil trend is slightly upward with a decrease in percent bare ground cover since 1991. Percent rock and pavement cover combined have declined as well. There are some signs of pedestalling, but the levelness of the site prevents excessive erosion from occurring. The browse trend is stable. Wyoming big sagebrush density has increased slightly since 1991, but still remains relatively low. Currently, it only accounts for 3% cover. Percent decadence has remained the same while the percentage of plants reported in poor vigor has increased to 13%. The herbaceous understory trend is downward. Perennial herbaceous understory sum of nested frequency is currently lower than what was reported in any other year. Grasses still dominate the site with individual species having shifted slightly in abundance over the years.

TREND ASSESSMENT
soil - slightly up (4)
browse - stable (3)
herbaceous understory - down (1)

2003 TREND ASSESSMENT

Soil trend is stable. Bare ground remains high, but is stable at just under 30%. Litter and herbaceous vegetation cover both slightly declined in 2003, but the ratio of protective cover (vegetation, litter, and cryptogams) to bare ground remains the same as that in 1998. Trend for browse is slightly down. Wyoming big sagebrush declined in total density as well as the proportion of young. Percent decadence increased to 40%, and it is likely that the sagebrush population will continue to decline in the future because there are more decadent and dying plants in the population than young to replace them. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses is slightly lower than in 1998, but crested wheatgrass remained stable in 2003, and Russian wildrye increased.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Management unit 22 , Study no: 11

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	205	198	211	209	18.53	11.03
G	Agropyron intermedium	$_{a}$4	$_{a}$14	$_{b}$37	$_{a}$3	.38	.15
G	Agropyron smithii	$_{b}$88	$_{c}$140	$_{a}$40	$_{a}$36	.53	.33
G	Aristida purpurea	-	3	-	-	-	-
G	Bromus tectorum (a)	-	-	15	2	.45	.00
G	Elymus junceus	$_{b}$152	$_{b}$168	$_{a}$96	$_{ab}$126	3.58	6.71
G	Oryzopsis hymenoides	26	28	14	11	.58	.45
G	Poa fendleriana	7	-	4	-	.03	-
G	Sitanion hystrix	-	-	2	-	.00	-
G	Stipa comata	3	7	4	6	.18	.31
Total for Annual Grasses		0	0	15	2	0.45	0.00
Total for Perennial Grasses		485	558	408	391	23.84	18.98
Total for Grasses		485	558	423	393	24.29	18.98
F	Astragalus cibarius	$_{b}$11	$_{ab}$2	$_{b}$8	$_{a}$-	.13	-
F	Cryptantha spp.	2	2	-	-	-	-
F	Cymopterus spp.	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	-	-	5	-	.04
F	Gilia spp. (a)	-	-	-	1	-	.00
F	Leucelene ericoides	$_{a}$33	$_{b}$66	$_{a}$30	$_{a}$13	.29	.11
F	Orobanche fasciculata	-	-	1	-	.00	-
F	Phlox longifolia	$_{a}$-	$_{b}$12	$_{ab}$3	$_{a}$-	.01	-
F	Ranunculus testiculatus (a)	-	-	$_{b}$16	$_{a}$2	.03	.00
F	Schoencrambe linifolia	-	-	2	-	.00	-
F	Sisymbrium altissimum (a)	-	-	2	2	.03	.00
F	Sphaeralcea coccinea	$_{b}$131	$_{b}$131	$_{a}$57	$_{a}$47	.41	.33
Total for Annual Forbs		0	0	18	10	0.06	0.05
Total for Perennial Forbs		177	213	102	60	0.86	0.44
Total for Forbs		177	213	120	70	0.92	0.50

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 22 , Study no: 11

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata wyomingensis	44	38	3.05	3.05
B	Ephedra nevadensis	0	1	-	.03
B	Gutierrezia sarothrae	4	0	.03	-
B	Opuntia spp.	0	1	-	-
Total for Browse		48	40	3.08	3.08

CANOPY COVER, LINE INTERCEPT --
Management unit 22 , Study no: 11

Species	Percent Cover
	'03
Artemisia tridentata wyomingensis	2.28
Opuntia spp.	.01

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 22 , Study no: 11

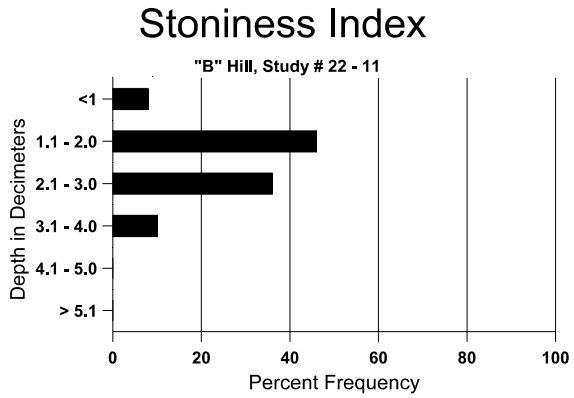
Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	1.3

BASIC COVER --
Management unit 22 , Study no: 11

Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	8.25	14.50	36.55	23.72
Rock	3.50	2.75	6.62	5.07
Pavement	34.00	22.00	12.07	32.39
Litter	34.50	19.50	22.30	18.14
Cryptogams	0	1.50	7.95	1.96
Bare Ground	19.75	39.75	29.41	27.14

SOIL ANALYSIS DATA --
Management unit 22, Study no: 11, Study Name: “B” Hill

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
13.3	67.6 (12.1)	7.1	52.0	23.4	24.6	1.9	4.6	211.2	0.8



PELLET GROUP DATA --
Management unit 22 , Study no: 11

Type	Quadrat Frequency '98	Quadrat Frequency '03	Days use per acre (ha) '98	Days use per acre (ha) '03
Rabbit	16	10	-	-
Deer	15	8	5 (12)	14 (35)
Cattle	2	1	13 (32)	4 (9)

BROWSE CHARACTERISTICS --
Management unit 22 , Study no: 11

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
85	**933**	-	133	800	-	-	71	7	0	0	20/22
91	**866**	-	66	600	200	-	69	8	23	0	24/27
98	**1200**	20	240	700	260	40	13	18	22	13	18/31
03	**1040**	-	40	580	420	80	31	35	40	15	21/29
Ephedra nevadensis											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	11/8

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Gutierrezia sarothrae											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**120**	-	20	100	-	-	0	0	-	0	8/9
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Opuntia spp.											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	3/2
Purshia tridentata											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	28/57